of these, but is the resistance of a solid metallic conductor.

The ampere, while defined primarily in terms of the C. G. S. system, and secondarily in reference to the silver voltameter, is in practice determined by the dynamic action of one current upon another. In the same way, the volt is not in practice referred to the C. G. S. system of units, nor is it determined by comparison with the Clark cell, but by the measurement of the rotation effect upon a part of a certain instrument when the electro-motive force is applied between certain points in that instrument.

One cannot refrain from the opinion that, from an absolutely metrological standpoint, the regulations of the 'Order in Council' should be condemned rather than approved; however, personal conference with the representatives of the English Board of Trade and Standardizing Laboratory reveals the fact that the material representations of electrical units, thus provided, are to be considered as but tentative in character, adopted on account of greater convenience in actual practice, and to be continually revised and corrected by reference to the fundamental definitions, which are essentially the same as those approved by the representatives of Great Britain at the Chicago Congress, and where they do differ from those are, it will be generally admitted, I think, on the whole, more sound.

It is very important for the United States that, when the time shall come, as it must before long, for the preparation of material representations of as many of the electrical units that have been legalized as can conveniently be represented, the greatest effort shall be made to see that there be no hasty action, and that, as far as possible, already well established principles of metrology shall be strictly applied.

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THE HUMANITIES.

THE study of the history of mankind is logically developed into five great branches, viz.: industries, pleasures, languages, institutions and opinions. These are the *Humanities.* Into all of these realms modern scientific research penetrates and seeks to discover their origin and development from the beginning of primeval human life to the present time. In following the course of humanity from the earliest savagery to the highest enlightenment it is found that man has traveled by five parallel roads from the starting place of ignorance toward the goal of wisdom. Now he travels on one road, now on another, parceling out his activities and dividing his time between all. On wings of thought he passes from way to way. When he travels by one road he seems to have one end in view, by another road another end in view, and yet as often as he may change his goal and the road by which he travels he is pursuing the route to wisdom. He may travel by false charts, or he may lose his way, and yet the end in view may remain the same. He engages in the arts of industry and the purpose is welfare; he engages in the arts of pleasure and the purpose is happiness; he engages in the arts of speech and the purpose is expression; he engages in institutional arts and the purpose is justice; he engages in the arts of learning and the purpose is knowledge. In the way by labor, the way by pleasure, the way by speech, the way by institutions and the way by learning—in all ways—he runs to the goal of wisdom.

In all the research prosecuted during the present century, and especially during the later decades, one great generalization is reached from the multitudinous facts gathered from the world; this is the intellectual unity of the human race. The history of the lower animals, from primeval geologic time to the present, exhibits a constant differentiation of species, genera, orders and

higher groups. The evolution of animal life is the unfolding of new forms. In the study of mankind this evolution is replaced by an involution which tends toward unification. In his early history biotic forms and varieties were developed, with more or less differentiation of functions. Some men were high of stature, others were low of stature; some men were blondes, others were brunettes; some men had long skulls, others short skulls; some men had their eyes placed obliquely, others horizontally; some men had round hair, others had flat hair. The tendency in the beginning was toward the differentiation of varieties, which, had man continued in his lowly estate on a plane with the lower animals, might have resulted in the differentiation of species not interfertile with one another; but with mankind interfertility was preserved.

Man was endowed with superior intellect. He had outrun the lower animals in the race of culture and began to develop the five great activities: industry, pleasure, speech, government and learning. With these evolving powers the evolution of varieties was checked. The evolution of activities superseded the evolution of biotic varieties, and man's course of development was by involution and seriation; men became more and more interdependent, and this is involution. Some men made more progress in the five great activities than others, but all progress resulted in serial development. So some peoples have a higher culture than others. All of the human activities are interrelated and ever become more and more interrelated. Not only are the activities interrelated, but the peoples themselves become more and more interrelated through them in the progress of activital development.

Let us now take a hasty view of mankind in his early estate, moving along the highways of progress toward the present time. Early man was scattered over all the earth in kinship tribes, each one knit together by bonds of kindred blood and cords of marriage ties. All tribal society was thus organized. These little tribes, in vast numbers, each contained but a few individuals who inhabited the Eden between the walls of ice. Their arts of welfare sprung from conditions of local environment. Where the waters were abundant they became fishermen; where the beasts of the wold and prairie were plenty they became hunters, where the fruits of the forest and plain were rich they became gleaners, and where all of these sources of supply existed their food industries were diversified. In frigid lands they built their houses of snow and ice; in forest lands they built their homes of shards of trees, boughs and bark; in the savannahs they built their homes of reeds and mats; in arid lands of naked rock and cliff they built their homes of stone—everywhere they adapted the materials of the local environment to their use. Where the beasts were plenty they made their clothing of pelts; where animals yielded wool they made their clothing of woolen fibers; where fibrous plants were abundant they made their clothing of vegetable tapestries, and they decorated homes and clothing with the pigments and stains which they found where they lived. So man started on the way of welfare.

The children of these little tribes had their youthful sports. They kept playhouse as their mothers kept house; they played with dolls as their mothers played with babies; they played at hunting as their fathers were hunters; they played at fishing as their fathers were fishermen; they played at fruit gathering as their fathers and mothers gathered fruit; and they played at war as their heroes made war, and thus mimetic sports were developed. The elders engaged in running races, in wrestling matches and various

games of athletic prowess and skill, and thus their athletic sports began. They engaged in games of chance and staked their little stores of wealth and sought to divine their chances and developed simple methods of divination, and thus their intellectual games began. With sports of mimicry, sports of athletic skill and sports of chance and divination, the highway of pleasure was entered.

They began to express their ideas by gesture speech and oral speech in imitation of the sights and sounds of the world, and especially of the characteristics of one another; thus gesture speech and oral speech began, and the tribes entered upon the highway of speech.

In the biotic constitution of man the seeds of government are planted, for there must be husbands and wives, parents and children, and there must be authority and obedience. As the kinship tribes were developed authority and obedience grew with the group, and a system of terms was developed by which kinship through streams of blood and marriage relations was clearly exhibited, and to the elder was given the right to command, and to the younger the duty to obey—a system of perfect equality, for every individual grew in authority as he grew in years, and must command some and obey others. Thus began forms of government, and the tribes entered upon the highway of institutions.

Every child learns by experience. The accumulation of experience from infancy to old age is great even with primal man, but by speech the experience of the elder is taught to the younger. In the stream of generations there are elder and younger in every tribe, and the experience of ancestors is handed down. Thus primal man entered upon the highway of learning.

Let us see where the human race began. A multitude of kinship tribes spread over the habitable earth, each tribe on the highways of progress, with simple arts suited to local environment, with simple pleasures suited to home environment, with simple speech developed from the gestures and vocal sounds of men and the lower animals and the scenes of nature found in the environment, with simple governments developed out of biotic life conforming to the environment of kinship and age and the needs of daily life, and with simple knowledge gathered by the individual through experience and transmitted one to another by speech and handed down from generation to generation in an ever-growing stream of wisdom, all taught by the environment.

In this picture we have primal men in multitudes of distinct tribes under the differentiating forces of environment by which they may be developed into species, but for one overpowering factor—superior human intellect. There can be but one kind of mind. Two and two are four with every people; the moon is round, gibbous or crescent wherever it shines for man; the sun shines in every eye; the child grows in every experience. Thus the four great mental activities of number, form, cause and becoming are the same in every land, and the mind of every man is a unity of these four powers, and every mind is like every other mind in their possession. They differ only in extent of experience acquired directly by self or indirectly from others. While the mind is the same with all men the will is the same. All desire to gain good and to avoid evil, so all wills develop on a common plan. By mind and will, by mentality and volition, man progresses on the five highways of life, so that all men are impelled to the same goal of wisdom. Pursuit of the common end has proved to be more powerful in producing involution than the forces of environment in producing differentiation or classific evolution. It now becomes necessary to make a hasty sketch of human evolution.

The kinship tribes first developed by man gradually underwent a change. Tribe coalesced with tribe, and when tribes became too large by union or by natural multiplication they divided. In the consolidation of tribes the plan of union by kinship remained. Two or more tribes allied their fortunes by intermarriage, each furnishing wives to the other; so the chains of affinity were forged, and out of this affinity spring new bonds of consanguinity. In succeeding generations fathers and mothers belong to different clans, and each tribe is made up of individuals, every member of which is kin to both primal tribes. Kinship through affinity and kinship, through consanguinity, was maintained in knowledge by a device of naming, so that the name not only expressed kinship by clan, but also kinship by tribe as composed of clans, and at the same time expressed relative age by which authority was claimed and yielded and primeval equality maintained. In the coalescing of tribes in this manner a new generation became heirs to the activities of the coalescing tribes. They inherited industries, pleasures, languages, institutions and opinions of the ancestral tribes. So tribes coalesced with tribes and divided and coalesced again, until tribal society was lost in the confusion of ancestries. Then nations were born, based not on kinship bonds but on territorial boundaries. The first nation and every other nation since has in its very organization lost its ancestral identity by multiplied admixture of streams of blood. To speak of a nation as of one blood or as derived from one primeval tribe with its primitive industries, pleasures, speech, institutions and opinions is absurd. To search for the origin of a nation in one primeval tribe having some one or all of the primeval activities is a search for the impossible.

It is thus that the study of the human race has led to the discovery of its unity. It is found that we cannot classify men as biotic kinds with differing forms, functions and genealogies, as the lower animals are classified. An early tendency to such differentiation is discovered, but it is farther learned that this tendency has been partially obliterated and greatly obscured in the later history of mankind. By these discoveries many interesting facts have been recorded of variations in human forms, functions and genealogies. The study is one of interest and proves to be valuable. Thus the old science of ethnology remains as the study of biotic varieties of mankind, and is pursued with more vigor than ever and becoming of more and more importance.

In the study of ethnology as the science of biotic races the attempt was early made to supplement biotic characteristics with cultural characteristics from the domain of arts, or, as they are here called, *humanities*. This has led to the development of a new science pertaining to human activities as herein classified, and to which the term *demology* is sometimes given, while even the term ethnology is made to include both the biotic and the activital history of mankind. It may be well to keep the term ethnology to the limits of its primitive use and to adopt the term demology for the new science of human activities.

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Zoölogical Nomenclature.

The earliest generic name of the ground squirrels commonly placed in the genus Spermophilus.

The eccentric Rafinesque, who imposed such a multitude of new names upon animals and plants, seems to have been first to name the group of ground squirrels for which the later name *Spermophilus* of Cuvier (1825) has been in common use for more than half a century. In 1817 Rafinesque published a paper entitled 'Descriptions of new genera of North American Quadrupeds,'